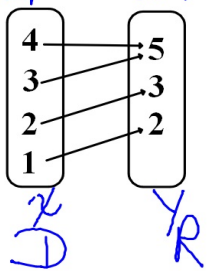
2.1 Functions and their Graphs

Sept 13

A *relation* is a set of points.

domain: x- coordinates *range:* y- coordinates

Ex. 1: Mapping



relation: (4,5)(3,5)(2,3)(1,2)

function

Ex. 2 find the domain: $\{(x,y): |y| = 1-x^2\}$

$|y| \geq 0$ (rule)

D: $1-x^2 \geq 0$

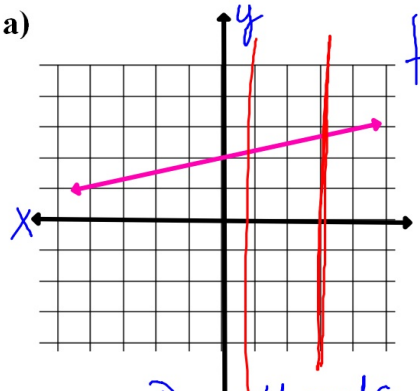
$-1 \leq x \leq 1$

A relation is a *function* if and only if each domain element is paired with exactly 1 range element.

x y

Ex. 3 State the domain and range. Is the relation a function?

a)

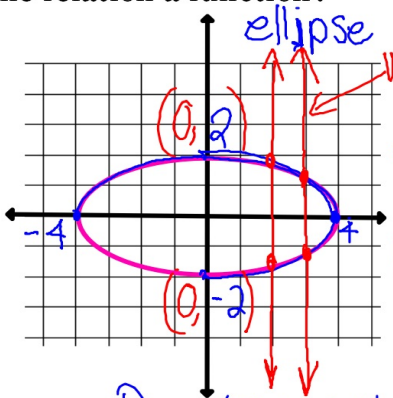


function

D: all reals

R: all reals

b)



ellipse

vertical line test

not a function

D: $-4 \leq x \leq 4$

R: $-2 \leq y \leq 2$

linear *equation* $y = mx + b$ (x, y) any pt on line

linear *function* $f(x) = mx + b$ $(x, f(x))$ any pt on line

("f of x")

Ex. 4 **Is** $f(x) = \frac{-3}{4}x^2 - x + 8$ **linear?** NO

Evaluate the function when $x = -6$.

$f(-6) = -3/4(-6)^2 - (-6) + 8$ (36)

$-27 + 6 + 8 = -13$